

PATENT ABSTRACTS OF JAPAN

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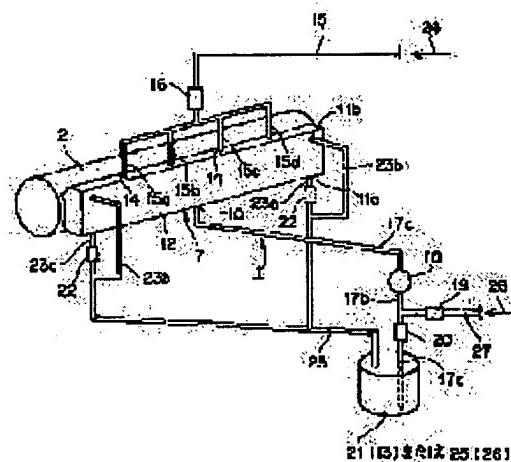
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(54) FLEXOGRAPHIC PRESS

(57)Abstract:

PROBLEM TO BE SOLVED: To shorten the ink replacing time while preventing corruption of new order ink by providing an air supply port above an ink chamber and supplying high pressure air at an appropriate timing, thereby proceeding a series of ink replacing cycles efficiently.

SOLUTION: In the flexographic press, a plurality of air supply ports 14 are made, at an appropriate interval, along the axial direction of an anilox roll 2 through a frame 7 above and ink chamber 12. Each air supply port 14 is coupled with an air supply pipe 15a-15d branched from an air supply pipe 15. The air supply pipe 5 is provided with a solenoid valve 16 for opening/ closing the air supply pipe 15 and coupled with an air source, e.g. a compressor, for supplying the air 24. These air supply pipes 15, 15a-15d, the solenoid valve 16 and the air source constitute an air supply system for supplying high pressure air 24 from the air supply port 14 into the ink chamber 12 at an appropriate timing.



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CLAIMS

[Claim(s)]

[Claim 1] A chamber frame and the seal blade prepared in this chamber frame upper limit, Flexo ink is supplied into the ink chamber which is surrounded by the doctor blade formed in this chamber frame lower limit, and the anilox roll which rotates while contacting these seal blades and doctor blades, and is formed. In the flexographic press which prints by carrying out transition supply of the ink to the peripheral face of this anilox roll, while an air feed hopper is prepared in this ink chamber upper part The flexographic press with which the air supply system which can supply high-pressure air from this air feed hopper into this ink chamber to proper timing is characterized by connecting with this air feed hopper.

[Claim 2] The flexographic press according to claim 1 with which this air feed hopper is characterized by preparing more than one in accordance with the shaft orientations of this anilox roll.

DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the flexographic press which prints to printing hands-ed, such as a corrugated paper sheet manufactured by the ** machine made from corrugated paper.

[0002]

[Description of the Prior Art] As it is the perspective view showing the flexographic press of the former [drawing 7] typically, and the typical side elevation fracturing and showing a part of flexographic press of the former [drawing 8] and is shown in these drawing 7 and drawing 8 , a flexographic press consists of the ink feeder 1, anilox roll 2, a lithographic plate 3, a printing cylinder 4, and impression cylinder (carrier roll) 6 grade, and prints to the printing hands 5-ed, such as a corrugated paper sheet.

[0003] Here, the lithographic plate 3 is coiled around the peripheral face of a printing cylinder 4. Moreover, anilox roll 2 carries out transition supply of the ink 13 on the front face of a lithographic plate 3 by rotating contacting the peripheral face (front face of a lithographic plate 3) of a printing cylinder 4, while flexo ink (only henceforth ink) 13 is supplied by the peripheral face from the ink feeder 1. Under the printing cylinder 4, opposite arrangement of the impression cylinder 6 is carried out, the printing hand 5-ed is put with rotation with an impression cylinder 6 and a printing cylinder 4 among these impression cylinders 6 and printing cylinders 4

(lithographic plate 3), and printing to the printing hand 5-ed is performed by the lithographic plate 3.

[0004] The chamber frame 7 on which the ink chamber 12 constitutes a posterior wall of stomach and a right-and-left both-sides wall in the ink feeder 1 (only henceforth a frame), The seal blade 8 prepared in the upper limit of this frame 7, and the doctor blade 9 formed in the lower limit of a frame 7, By being surrounded with the anilox roll 2 which rotates while contacting these seal blades 8 and doctor blades 9 It is formed in accordance with the shaft orientations of anilox roll 2, and the ink 13 held in the ink chamber 12 contacts the front face of anilox roll 2.

[0005] Moreover, that the ink chamber 12 should be connected to a series of ink circulation paths, the ink feed hopper 10 is formed in the upper part of a frame 7, ink recovery opening 11a is formed in the lower part of a frame 7, and also in order to hold uniformly the amount of the ink 13 in the ink chamber 12 (the location of an ink oil level is held uniformly), surplus ink recovery opening 11b which collects surplus ink is formed in the predetermined location of a frame 7. In addition, as shown in drawing 7, only one ink feed hopper 10 is formed in the center section of the longitudinal direction (shaft orientations of anilox roll 2) of a frame 7, and ink recovery opening 11a and surplus ink recovery opening 11b are formed in every one both ends of the longitudinal direction (shaft orientations of anilox roll 2) of a frame 7.

[0006] And the ink supply system for supplying the ink 13 in the ink container 21 to the ink chamber 12 consists of ink supply pipe 17a, a solenoid valve 20, ink supply pipe 17b, the ink pump 18, ink supply pipe 17c, an ink pot 28, and 17d of ink supply pipes. That is, after the ink 13 in the ink container 21 is sucked up by operating the ink pump 18 where a solenoid valve 20 is opened and the ink pot 28 is supplied via ink supply pipe 17a, a solenoid valve 20, ink supply pipe 17b, the ink pump 18, and ink supply pipe 17c, the ink chamber 12 is supplied from this ink pot 28 via 17d of ink supply pipes, and the ink feed hopper 10.

[0007] On the other hand, the ink recovery system for collecting the ink 13 in the ink chamber 12 in the ink container 21 consists of ink recovery tubing 23a, surplus ink recovery tubing 23b, ink recovery tubing 23, and a solenoid 22. That is, ink recovery opening 11a of ink chamber 12 pars basilaris ossis occipitalis is connected to the ink container 21 through ink recovery tubing 23a, a solenoid valve 22, and the ink recovery tubing 23, and by opening a solenoid valve 22, the ink 13 in the ink chamber 12 falls with a self-weight, and is collected by the ink container 21 via ink recovery opening 11a, ink recovery tubing 23a, a solenoid valve 22, and the ink recovery tubing 23.

[0008] Moreover, surplus ink recovery opening 11b minds surplus ink recovery tubing 23b. If it joins and connects rather than the solenoid valve 22 at the ink recovery tubing 23 of the downstream and the ink 13 in the ink chamber 12 exceeds a constant rate (predetermined ink oil-level height) The ink 13 for the surplus is always collected in the ink container 21 via surplus ink recovery opening 11b, surplus ink recovery tubing 23b, and the ink recovery tubing 23.

[0009] In addition, as shown in drawing 7, in case the wash water supply pipe 27 is connected with ink supply pipe 17b interposed between the solenoid valve 20 and the ink pump 18 through the solenoid valve 19 and ink washing within an ink circulation path (an ink supply system and ink recovery system) is performed on the occasion of the ink exchange accompanying an order change etc., wash water 26 is supplied through the wash water supply pipe 27. At this time, it replaces with the ink container 21 and the waste fluid can 25 is connected to an ink circulation path. In addition, about the detail of washing actuation, it mentions later, referring to drawing 9 - drawing 12.

[0010] By the above-mentioned configuration, the flexo ink 13 in the ink container 21 By operating the ink pump 18, where a solenoid valve 20 is opened After being sucked up by ink supply pipe 17a and supplying the ink pot 28 via ink supply pipe 17a, a solenoid valve 20, ink supply pipe 17b, the ink pump 18, and ink supply pipe 17c, The ink chamber 12 is supplied from this ink pot 28 via 17d of ink supply pipes, and the ink feed hopper 10.

[0011] After the ink 13 supplied in the ink chamber 12 contacts to the peripheral face of this anilox roll 2 directly and adheres to it with rotation (rotation of the direction of the circumference of an anti-clock in drawing 8) of anilox roll 2, it is scratched by homogeneity with the doctor blade 9 of the downstream, is adjusted to the ink coat of given thickness, and is sent out out of the ink chamber 12.

[0012] And when anilox roll 2 rotates contacting the lithographic plate 3 of printing cylinder 4 peripheral face, transition supply of the ink 13 adhering to the peripheral face of anilox roll 2 is carried out on the front face of a lithographic plate 3. It is printed by ****(ing) to the lithographic plate 3 to which ink 13 was supplied, the printing hands 5-ed, such as a corrugated paper sheet, being put with rotation with an impression cylinder 6 and a printing cylinder 4 among these impression cylinders 6 and printing cylinders 4 (lithographic plate 3), and passing this part.

[0013] By the way, termination of printing of a predetermined lot performs exchange (order change) to another color ink needed in degree order. This ink exchange cycle is explained referring to drawing 9 - drawing 12 . Each of drawing 9 - drawing 12 is drawings (the same perspective view as drawing 7) for explaining an ink exchange cycle including the ink washing actuation in the conventional flexographic press.

[0014] The condition at the time of ink circulation, i.e., the condition under usual printing operation, is shown by drawing 9 . At the time of ink circulation, as shown in this drawing 9 , if the ink pump 18 is operated where it closed the wash water supply side solenoid valve 19 and the ink supply side solenoid valve 20 is opened, ink 13 will be supplied to the ink pot 28 via the ink supply pipes 17a-17c from the ink container 21, and will be further sent in into the ink chamber 12 through 17d of ink supply pipes, and the ink feed hopper 10.

[0015] At this time, a solenoid valve 22 will be closed, it will be inhibited that the ink 13 in the ink chamber 12 flows out of ink recovery opening 11a and ink recovery tubing 23a, and ink 13 will be full in the ink chamber 12. And the ink 13 for the surplus supplied superfluously is sent out through surplus ink recovery opening 11b and surplus ink recovery tubing 23b, and is collected into the ink container 21 through the ink recovery tubing 23. Thus, where ink 13 is maintained at the specified quantity in printing operation of a flexographic press and within the ink chamber 12, circulation of ink 13 is performed.

[0016] The condition at the time of ink recovery is shown by drawing 10 . As shown in this drawing 10 , while stopping supply of the ink 13 to the ink pot 28 and the ink chamber 12 by suspending actuation of the ink pump 18, at the time of ink recovery, the solenoid valve 22 in the lower stream of a river of ink recovery tubing 23a is opened. Thereby, the ink 13 of the side which flows into the ink pot 28 flows backwards ink supply pipe 17c, the ink pump 18, ink supply pipe 17b, a solenoid valve 20, and ink supply pipe 17a, and is collected into the ink container 21. Moreover, the ink 13 of the side which flows out of the ink pot 28 flows out via 17d of ink supply pipes, the ink chamber 12, ink recovery tubing 23a, a solenoid valve 22, and the ink recovery tubing 23, and is collected into the ink container 21. After only predetermined time maintains such a condition and waiting for the natural outflow by the self-weight of ink 13, it goes into the following process.

[0017] The condition at the time of ink washing is shown by drawing 11. At the time of ink washing, as shown in this drawing 11, as it is shown in drawing 10, after collecting ink 13, the connection substitute of ink supply pipe 17a and the ink recovery tubing 23 is carried out from the ink container 21 to the waste fluid can 25, and the ink supply side solenoid valve 20 and the ink recovery side solenoid valve 22 are closed.

[0018] Then, while opening the wash water supply side solenoid valve 19, by operating the ink pump 18, like the time of ink 13 circulating, the wash water 26 from the wash water supply pipe 27 is supplied to the ink pot 28 via a solenoid valve 19, ink supply pipe 17b, the ink pump 18, and ink supply pipe 17c, and is further sent in into the ink chamber 12 through 17d of ink supply pipes.

[0019] Since the solenoid valve 22 is closed at this time, it is inhibited that the wash water 26 supplied in the ink chamber 12 flows out of ink recovery opening 11a and ink recovery tubing 23a, and the inside of the ink chamber 12 is full with wash water 26. And the wash water 26 with which it overflowed from surplus ink recovery opening 11b is sent out through surplus ink recovery tubing 23b, and is collected into the waste fluid can 25 through the ink recovery tubing 23. Only predetermined time maintains such a condition and circulation of wash water 26 washes the inside of an ink circulation path.

[0020] The condition at the time of wash water recovery is shown by drawing 12. As shown in this drawing 12, at the time of wash water recovery, supply of the wash water 26 to the ink pot 28 and the ink chamber 12 is stopped by suspending actuation of the ink pump 18. Then, while closing the wash water supply side solenoid valve 19, solenoid valves 20 and 22 are opened.

[0021] Thereby, the wash water 26 in ink supply pipe 17c and 17b flows backwards the ink pump 18, a solenoid valve 20, and ink supply pipe 17a, and is collected into the waste fluid can 25. Moreover, the wash water 26 of the side which flows out of the ink pot 28 flows out via 17d of ink supply pipes, the ink chamber 12, ink recovery tubing 23a, a solenoid valve 22, and the ink recovery tubing 23, and is collected into the waste fluid can 25. Only predetermined time maintains such a condition and waiting and all wash water 26 are made to discharge the natural outflow by the self-weight of wash water 26.

[0022] After predetermined time furthermore passes, printing corresponding to degree order is started by connecting the tip of ink supply pipe 17a and the ink recovery tubing 23 to the ink container 21 which held the ink 13 of degree order, and performing ink circulation, after setting it as the condition that drawing 9 explained each part.

[0023]

[Problem(s) to be Solved by the Invention] However, since recovery of ink 13, recovery of the waste fluid after washing (wash water 26), etc. wait for the natural outflow by the self-weight of ink 13 or wash water 26 and are performed in case ink washing is performed in the conventional flexographic press mentioned above, the recovery cannot take time amount and ink swap time accompanying an order change cannot be shortened.

[0024] Moreover, wash water 26 is ** which passes the same path as ink 13, and since it is not what washes the internal surface of the ink chamber 12 etc. positively, washing of the wall of the ink chamber 12 etc. becomes imperfect. The ink of new order degenerated, the fall of printing concentration and the printing failure of printing nonuniformity and others versatility occurred not only the operating ratio of a printing machine falls according to such faults, but, and the technical problem of reducing the quality of printed matter also occurred.

[0025] It aims at offering the flexographic press which prevented that the ink of new order degenerated and aimed at improvement in the quality of printed matter while it shortens ink swap

time, as it was originated in view of such a technical problem and this invention can perform certainly and efficiently a series of ink exchange cycles which include the ink recovery and ink washing within an ink circulation path on the occasion of the ink exchange accompanying an order change etc.

[0026]

[Means for Solving the Problem] In order to attain the above-mentioned purpose, the flexographic press (claim 1) of this invention A chamber frame and the seal blade prepared in chamber frame upper limit, Flexo ink is supplied into the ink chamber which is surrounded by the doctor blade formed in the chamber frame lower limit, and the anilox roll which rotates while contacting these seal blades and doctor blades, and is formed. In what prints by carrying out transition supply of the ink to the peripheral face of anilox roll, while preparing an air feed hopper in the ink chamber upper part It is characterized by connecting to an air feed hopper the air supply system which can supply high-pressure air from an air feed hopper into an ink chamber to proper timing.

[0027] At this time, two or more air feed hoppers may be prepared in accordance with the shaft orientations of anilox roll (claim 2).

[0028]

[Embodiment of the Invention] Hereafter, the gestalt of operation of this invention is explained with reference to a drawing. Each of typical side elevations which drawing 1 - drawing 6 show the flexographic press as 1 operation gestalt of this invention, and drawing 1 fractures the typical perspective view, and drawing 2 fractures the part, and are shown, drawing 3 - drawing 6 is drawings (the same perspective view as drawing 1) for explaining the ink exchange cycle in the flexographic press of this operation gestalt.

[0029] As shown in drawing 1 and drawing 2 , the flexographic press of this operation gestalt also consists of the ink feeder 1, anilox roll 2, a lithographic plate 3, a printing cylinder 4, and impression cylinder (carrier roll) 6 grade, and prints to the printing hands 5-ed, such as a corrugated paper sheet. [as well as the conventional thing shown in drawing 7 - drawing 12] Here, the lithographic plate 3 is coiled around the peripheral face of a printing cylinder 4. Moreover, anilox roll 2 carries out transition supply of the ink 13 on the front face of a lithographic plate 3 by rotating contacting the peripheral face (front face of a lithographic plate 3) of a printing cylinder 4, while flexo ink (only henceforth ink) 13 is supplied by the peripheral face from the ink feeder 1. Under the printing cylinder 4, opposite arrangement of the impression cylinder 6 is carried out, the printing hand 5-ed is put with rotation with an impression cylinder 6 and a printing cylinder 4 among these impression cylinders 6 and printing cylinders 4 (lithographic plate 3), and printing to the printing hand 5-ed is performed by the lithographic plate 3.

[0030] Moreover, the chamber frame 7 on which the ink chamber 12 constitutes a posterior wall of stomach and a right-and-left both-sides wall also in the ink feeder 1 of this operation gestalt (only henceforth a frame), The seal blade 8 prepared in the upper limit of this frame 7, and the doctor blade 9 formed in the lower limit of a frame 7, By being surrounded with the anilox roll 2 which rotates while contacting these seal blades 8 and doctor blades 9 It is formed in accordance with the shaft orientations of anilox roll 2, and the ink 13 held in the ink chamber 12 contacts the front face of anilox roll 2.

[0031] Thus, the basic structure of the flexographic press of this operation gestalt is the same as that of what was mentioned above in drawing 7 - drawing 12 , and among drawing, since the part the same [the same sign as a thing as stated above] or same is shown, the explanation is

omitted. Moreover, the printing hands 5-ed, such as a corrugated paper sheet, are put between a printing cylinder 4 and an impression cylinder 6, ink 13 is transferred through a lithographic plate 3, that is, since a series of actuation which prints is the same as that of the conventional flexographic press, the explanation is omitted.

[0032] By the way, the flexographic press of this operation gestalt possesses the function for washing certainly and efficiently the ink 13 of the old order adhering to the peripheral face of an ink circulation path and anilox roll 2 in exchange of the ink 13 accompanying an order change etc., and it explains the configuration of the part concerning the function, an operation, and effectiveness hereafter, referring to drawing 1 - drawing 6.

[0033] As shown in drawing 1 and drawing 2, in the flexographic press of this operation gestalt, in accordance with the shaft orientations (the longitudinal direction of a chamber 12, the direction of equipment breadth) of anilox roll 2, the air feed hopper 14 of plurality (drawing 1 four) opens suitable spacing in the frame 7 of the ink chamber 12 upper part, and is prepared in it. The air supply pipes 15a-15d which branched from the air supply pipe 15 are connected to each air feed hopper 14. Sources of air, such as a compressor which the solenoid valve 16 which opens and closes this air supply pipe 15 is infix, and also supplies air (compressed air) 24, are connected to the air supply pipe 15, and the air supply system which can supply high-pressure air 24 from the air feed hopper 14 into the ink chamber 12 to proper timing is constituted by these air supply pipes 15, 15a-15d, the solenoid valve 16, and the source of air.

[0034] In addition, like *****, by offering two or more air feed hoppers 14 along with the longitudinal direction of the ink chamber 12, it is constituted so that the pneumatic pressure of abbreviation homogeneity can be added about the longitudinal direction into the ink chamber 12. Moreover, with this operation gestalt, the ink feed hopper 10 is formed in the center section of the longitudinal direction (shaft orientations of anilox roll 2) of the frame 7 by the side of ink chamber 12 lower part, ink supply pipe 17c from the ink pump 18 is directly connected with this ink feed hopper 10, and the ink pot 28 (refer to drawing 7 - drawing 12) is omitted. Other ink circulation networks and wash water circulation networks are the same as that of the conventional thing mentioned above in drawing 7 - drawing 12.

[0035] Next, the ink exchange cycle in the flexographic press of this operation gestalt constituted like **** is explained, referring to drawing 3 R> 3 - drawing 6. The condition at the time of ink circulation, i.e., the condition under usual printing operation, is shown by drawing 3. As shown in this drawing 3, if the ink pump 18 is operated where it closed the wash water supply side solenoid valve 19 and the ink supply side solenoid valve 20 is opened, at the time of ink circulation, ink 13 will be sent in into the ink chamber 12 through the ink supply pipes 17a-17c and the ink feed hopper 10 from the ink container 21.

[0036] At this time, a solenoid valve 22 will be closed, it will be inhibited that the ink 13 in the ink chamber 12 flows out of ink recovery opening 11a and ink recovery tubing 23a, and ink 13 will be full in the ink chamber 12. And the ink 13 for the surplus supplied superfluously is sent out through surplus ink recovery opening 11b and surplus ink recovery tubing 23b, and is collected into the ink container 21 through the ink recovery tubing 23. Thus, where ink 13 is maintained at the specified quantity in printing operation of a flexographic press and within the ink chamber 12, circulation of ink 13 is performed.

[0037] The condition at the time of ink recovery is shown by drawing 4. As shown in this drawing 4, while stopping supply of the ink 13 to the ink pot 28 and the ink chamber 12 by suspending actuation of the ink pump 18, at the time of ink recovery, the solenoid valve 22 in the lower stream of a river of ink recovery tubing 23a is opened. Then, a pressure is added in the ink

chamber 12 by opening the solenoid valve 16 by the side of air supply, and supplying high-pressure air 24 into the ink chamber 12 through the air supply pipes 15, 15a-15d and the air feed hopper 14.

[0038] By this the ink 13 in the ink chamber 12 The path which flows backwards the ink feed hopper 10, ink supply pipe 17c, the ink pump 18, ink supply pipe 17b, a solenoid valve 20, and ink supply pipe 17a, and results in the ink container 21 while receiving the pressure by air 24, It passes along either of the paths which result in the ink container 21 via ink recovery opening 11a, ink recovery tubing 23a, a solenoid valve 22, and the ink recovery tubing 23, and is compulsorily collected into the ink container 21. After only predetermined time maintains such a condition, a solenoid valve 16 is closed and air supply is suspended.

[0039] Since two or more air feed hoppers 14 are offered along with the longitudinal direction of the ink chamber 12 at this time, into the ink chamber 12, the pneumatic pressure of abbreviation homogeneity can be added about that longitudinal direction. The condition at the time of ink washing is shown by drawing 5. At the time of ink washing, as shown in this drawing 5, as it is shown in drawing 4, after collecting ink 13, the connection substitute of ink supply pipe 17a and the ink recovery tubing 23 is carried out from the ink container 21 to the waste fluid can 25, and the ink supply side solenoid valve 20 and the ink recovery side solenoid valve 22 are closed.

[0040] Then, while opening the wash water supply side solenoid valve 19, the wash water 26 from the wash water supply pipe 27 is sent in into the ink chamber 12 like the time of ink 13 circulating by operating the ink pump 18 through a solenoid valve 19, ink supply pipe 17b, the ink pump 18, ink supply pipe 17c, and the ink feed hopper 10.

[0041] Since the solenoid valve 22 is closed at this time, it is inhibited that the wash water 26 supplied in the ink chamber 12 flows out of ink recovery opening 11a and ink recovery tubing 23a, and the inside of the ink chamber 12 is full with wash water 26. And the wash water 26 with which it overflowed from surplus ink recovery opening 11b is sent out through surplus ink recovery tubing 23b, and is collected as waste fluid into the waste fluid can 25 through the ink recovery tubing 23.

[0042] Moreover, with this operation gestalt, when circulating wash water 26 as mentioned above and performing ink washing, by opening and closing the solenoid valve 16 by the side of air supply intermittently, and supplying high-pressure air 24 into the ink chamber 12, the wash water 26 in the ink chamber 12 is stirred compulsorily, and the cleaning effect by wash water 26 is heightened. Only predetermined time maintains such a condition and circulation of wash water 26 washes the inside of an ink circulation path.

[0043] The condition at the time of wash water recovery is shown by drawing 6. As shown in this drawing 6, at the time of wash water recovery, supply of the wash water 26 to the ink chamber 12 is stopped by suspending actuation of the ink pump 18. Then, while closing the wash water supply side solenoid valve 19, solenoid valves 20 and 22 are opened. Then, a pressure is added in the ink chamber 12 by opening the solenoid valve 16 by the side of air supply, and supplying high-pressure air 24 into the ink chamber 12 through the air supply pipes 15, 15a-15d and the air feed hopper 14.

[0044] Like the time of ink recovery, by this the wash water 26 in the ink chamber 12 The path which flows backwards the ink feed hopper 10, ink supply pipe 17c, the ink pump 18, ink supply pipe 17b, a solenoid valve 20, and ink supply pipe 17a, and results in the ink container 21 while receiving the pressure by air 24, It passes along either of the paths which result in the ink container 21 via ink recovery opening 11a, ink recovery tubing 23a, a solenoid valve 22, and the ink recovery tubing 23, and is compulsorily collected as waste fluid into the waste fluid can 25.

After only predetermined time maintains such a condition, a solenoid valve 16 is closed and air supply is suspended.

[0045] After completing discharge of wash water 26 as mentioned above, printing corresponding to degree order is started by connecting the tip of ink supply pipe 17a and the ink recovery tubing 23 to the ink container 21 which held the ink 13 of degree order, and performing ink circulation, after setting it as the condition that drawing 3 explained each part. Thus, according to the flexographic press as 1 operation gestalt of this invention At the time of recovery of ink 13 and wash water 26 and washing by wash water 26, suitably electromagnetism -- by carrying out switching operation of the source 16, and supplying air (compressed air) 24 in the ink chamber 12 through the air supply pipes 15, 15a-15d and the air feed hopper 15 In a series of activities (recovery of the ink of the old order, washing, waste fluid recovery, etc.) which the internal pressure of the ink chamber 12 can be raised and are done in ink exchange While being able to perform compulsive stirring of the wash water 26 in the ink chamber 12, ink 13 and wash water 26 can be made to be able to discharge compulsorily, and can be collected.

[0046] Therefore, cleaning effects, such as the interior of the peripheral face of anilox roll 2 and the ink chamber 12 and an ink circulation path, increase sharply, and also recovery time amount is far shortened to recovery by the conventional natural discharge, and the swap time of an ink color can be shortened sharply. Thereby, the operating ratio of a flexographic press improves and productivity improves sharply. Moreover, since the ink 13 of the old order can be removed completely, the ink 13 of new order does not degenerate and printing failures, such as a fall of printing concentration and printing nonuniformity, do not occur, the quality of printed matter improves sharply.

[0047] In addition, the actuation timing of a piping network or a bulb (a solenoid valve 16 and solenoid valves 19, 20, and 22) etc. is not limited to the operation gestalt mentioned above, and the various formats except having illustrated can be used for it. Moreover, this invention is not limited to the operation gestalt mentioned above, in the range which does not deviate from this invention and its meaning, can deform variously and can be carried out.

[0048]

[Effect of the Invention] As explained in full detail above, according to the flexographic press (claim 1) of this invention, by the very simple configuration of supplying air in an ink chamber through an air feed hopper from an air supply system, the compressed air can be fed into an ink chamber, internal pressure can be raised, and the following effectiveness thru/or advantages can be acquired.

[0049] (1) With the internal pressure of the ink chamber which carried out the pressure up of the recovery of the old order ink performed on the occasion of ink exchange, and the recovery of a penetrant remover, it becomes possible to carry out discharge recovery compulsorily, recovery time amount is far shortened to recovery by the conventional natural discharge, and ink swap time is shortened sharply. Therefore, the operating ratio of a flexographic press improves and productivity improves sharply.

[0050] (2) Since the old order ink of an ink circulation path, the interior of an ink chamber, and an anilox roll peripheral face can be removed completely, the ink of new order does not degenerate and printing failures, such as a fall of printing concentration and printing nonuniformity, do not occur by injection of a compressed air, the quality of printed matter improves sharply.

(3) The effectiveness which can add pneumatic pressure is in abbreviation homogeneity about

the longitudinal direction into (claim 2) and an ink chamber by offering two or more air feed hoppers along with the longitudinal direction of an ink chamber.

TECHNICAL FIELD

[Field of the Invention] This invention relates to the flexographic press which prints to printing hands-ed, such as a corrugated paper sheet manufactured by the ** machine made from corrugated paper.

PRIOR ART

[Description of the Prior Art] As it is the perspective view showing the flexographic press of the former [drawing 7] typically, and the typical side elevation fracturing and showing a part of flexographic press of the former [drawing 8] and is shown in these drawing 7 and drawing 8 , a flexographic press consists of the ink feeder 1, anilox roll 2, a lithographic plate 3, a printing cylinder 4, and impression cylinder (carrier roll) 6 grade, and prints to the printing hands 5-ed, such as a corrugated paper sheet.

[0003] Here, the lithographic plate 3 is coiled around the peripheral face of a printing cylinder 4. Moreover, anilox roll 2 carries out transition supply of the ink 13 on the front face of a lithographic plate 3 by rotating contacting the peripheral face (front face of a lithographic plate 3) of a printing cylinder 4, while flexo ink (only henceforth ink) 13 is supplied by the peripheral face from the ink feeder 1. Under the printing cylinder 4, opposite arrangement of the impression cylinder 6 is carried out, the printing hand 5-ed is put with rotation with an impression cylinder 6 and a printing cylinder 4 among these impression cylinders 6 and printing cylinders 4 (lithographic plate 3), and printing to the printing hand 5-ed is performed by the lithographic plate 3.

[0004] The chamber frame 7 on which the ink chamber 12 constitutes a posterior wall of stomach and a right-and-left both-sides wall in the ink feeder 1 (only henceforth a frame), The seal blade 8 prepared in the upper limit of this frame 7, and the doctor blade 9 formed in the lower limit of a frame 7, By being surrounded with the anilox roll 2 which rotates while contacting these seal blades 8 and doctor blades 9 It is formed in accordance with the shaft orientations of anilox roll 2, and the ink 13 held in the ink chamber 12 contacts the front face of anilox roll 2.

[0005] Moreover, that the ink chamber 12 should be connected to a series of ink circulation paths, the ink feed hopper 10 is formed in the upper part of a frame 7, ink recovery opening 11a is formed in the lower part of a frame 7, and also in order to hold uniformly the amount of the ink 13 in the ink chamber 12 (the location of an ink oil level is held uniformly), surplus ink recovery opening 11b which collects surplus ink is formed in the predetermined location of a frame 7. In addition, as shown in drawing 7 , only one ink feed hopper 10 is formed in the center section of the longitudinal direction (shaft orientations of anilox roll 2) of a frame 7, and ink recovery opening 11a and surplus ink recovery opening 11b are formed in every one both ends of the longitudinal direction (shaft orientations of anilox roll 2) of a frame 7.

[0006] And the ink supply system for supplying the ink 13 in the ink container 21 to the ink

chamber 12 consists of ink supply pipe 17a, a solenoid valve 20, ink supply pipe 17b, the ink pump 18, ink supply pipe 17c, an ink pot 28, and 17d of ink supply pipes. That is, after the ink 13 in the ink container 21 is sucked up by operating the ink pump 18 where a solenoid valve 20 is opened and the ink pot 28 is supplied via ink supply pipe 17a, a solenoid valve 20, ink supply pipe 17b, the ink pump 18, and ink supply pipe 17c, the ink chamber 12 is supplied from this ink pot 28 via 17d of ink supply pipes, and the ink feed hopper 10.

[0007] On the other hand, the ink recovery system for collecting the ink 13 in the ink chamber 12 in the ink container 21 consists of ink recovery tubing 23a, surplus ink recovery tubing 23b, ink recovery tubing 23, and a solenoid 22. That is, ink recovery opening 11a of ink chamber 12 pars basilaris ossis occipitalis is connected to the ink container 21 through ink recovery tubing 23a, a solenoid valve 22, and the ink recovery tubing 23, and by opening a solenoid valve 22, the ink 13 in the ink chamber 12 falls with a self-weight, and is collected by the ink container 21 via ink recovery opening 11a, ink recovery tubing 23a, a solenoid valve 22, and the ink recovery tubing 23.

[0008] Moreover, surplus ink recovery opening 11b minds surplus ink recovery tubing 23b. If it joins and connects rather than the solenoid valve 22 at the ink recovery tubing 23 of the downstream and the ink 13 in the ink chamber 12 exceeds a constant rate (predetermined ink oil-level height) The ink 13 for the surplus is always collected in the ink container 21 via surplus ink recovery opening 11b, surplus ink recovery tubing 23b, and the ink recovery tubing 23.

[0009] In addition, as shown in drawing 7, in case the wash water supply pipe 27 is connected with ink supply pipe 17b interposed between the solenoid valve 20 and the ink pump 18 through the solenoid valve 19 and ink washing within an ink circulation path (an ink supply system and ink recovery system) is performed on the occasion of the ink exchange accompanying an order change etc., wash water 26 is supplied through the wash water supply pipe 27. At this time, it replaces with the ink container 21 and the waste fluid can 25 is connected to an ink circulation path. In addition, about the detail of washing actuation, it mentions later, referring to drawing 9 - drawing 12.

[0010] By the above-mentioned configuration, the flexo ink 13 in the ink container 21 By operating the ink pump 18, where a solenoid valve 20 is opened After being sucked up by ink supply pipe 17a and supplying the ink pot 28 via ink supply pipe 17a, a solenoid valve 20, ink supply pipe 17b, the ink pump 18, and ink supply pipe 17c, The ink chamber 12 is supplied from this ink pot 28 via 17d of ink supply pipes, and the ink feed hopper 10.

[0011] After the ink 13 supplied in the ink chamber 12 contacts to the peripheral face of this anilox roll 2 directly and adheres to it with rotation (rotation of the direction of the circumference of an anti-clock in drawing 8) of anilox roll 2, it is scratched by homogeneity with the doctor blade 9 of the downstream, is adjusted to the ink coat of given thickness, and is sent out out of the ink chamber 12.

[0012] And when anilox roll 2 rotates contacting the lithographic plate 3 of printing cylinder 4 peripheral face, transition supply of the ink 13 adhering to the peripheral face of anilox roll 2 is carried out on the front face of a lithographic plate 3. It is printed by ****(ing) to the lithographic plate 3 to which ink 13 was supplied, the printing hands 5-ed, such as a corrugated paper sheet, being put with rotation with an impression cylinder 6 and a printing cylinder 4 among these impression cylinders 6 and printing cylinders 4 (lithographic plate 3), and passing this part.

[0013] By the way, termination of printing of a predetermined lot performs exchange (order change) to another color ink needed in degree order. This ink exchange cycle is explained

referring to drawing 9 - drawing 12. Each of drawing 9 - drawing 12 is drawings (the same perspective view as drawing 7) for explaining an ink exchange cycle including the ink washing actuation in the conventional flexographic press.

[0014] The condition at the time of ink circulation, i.e., the condition under usual printing operation, is shown by drawing 9. At the time of ink circulation, as shown in this drawing 9, if the ink pump 18 is operated where it closed the wash water supply side solenoid valve 19 and the ink supply side solenoid valve 20 is opened, ink 13 will be supplied to the ink pot 28 via the ink supply pipes 17a-17c from the ink container 21, and will be further sent in into the ink chamber 12 through 17d of ink supply pipes, and the ink feed hopper 10.

[0015] At this time, a solenoid valve 22 will be closed, it will be inhibited that the ink 13 in the ink chamber 12 flows out of ink recovery opening 11a and ink recovery tubing 23a, and ink 13 will be full in the ink chamber 12. And the ink 13 for the surplus supplied superfluously is sent out through surplus ink recovery opening 11b and surplus ink recovery tubing 23b, and is collected into the ink container 21 through the ink recovery tubing 23. Thus, where ink 13 is maintained at the specified quantity in printing operation of a flexographic press and within the ink chamber 12, circulation of ink 13 is performed.

[0016] The condition at the time of ink recovery is shown by drawing 10. As shown in this drawing 10, while stopping supply of the ink 13 to the ink pot 28 and the ink chamber 12 by suspending actuation of the ink pump 18, at the time of ink recovery, the solenoid valve 22 in the lower stream of a river of ink recovery tubing 23a is opened. Thereby, the ink 13 of the side which flows into the ink pot 28 flows backwards ink supply pipe 17c, the ink pump 18, ink supply pipe 17b, a solenoid valve 20, and ink supply pipe 17a, and is collected into the ink container 21. Moreover, the ink 13 of the side which flows out of the ink pot 28 flows out via 17d of ink supply pipes, the ink chamber 12, ink recovery tubing 23a, a solenoid valve 22, and the ink recovery tubing 23, and is collected into the ink container 21. After only predetermined time maintains such a condition and waiting for the natural outflow by the self-weight of ink 13, it goes into the following process.

[0017] The condition at the time of ink washing is shown by drawing 11. At the time of ink washing, as shown in this drawing 11, as it is shown in drawing 10, after collecting ink 13, the connection substitute of ink supply pipe 17a and the ink recovery tubing 23 is carried out from the ink container 21 to the waste fluid can 25, and the ink supply side solenoid valve 20 and the ink recovery side solenoid valve 22 are closed.

[0018] Then, while opening the wash water supply side solenoid valve 19, by operating the ink pump 18, like the time of ink 13 circulating, the wash water 26 from the wash water supply pipe 27 is supplied to the ink pot 28 via a solenoid valve 19, ink supply pipe 17b, the ink pump 18, and ink supply pipe 17c, and is further sent in into the ink chamber 12 through 17d of ink supply pipes.

[0019] Since the solenoid valve 22 is closed at this time, it is inhibited that the wash water 26 supplied in the ink chamber 12 flows out of ink recovery opening 11a and ink recovery tubing 23a, and the inside of the ink chamber 12 is full with wash water 26. And the wash water 26 with which it overflowed from surplus ink recovery opening 11b is sent out through surplus ink recovery tubing 23b, and is collected into the waste fluid can 25 through the ink recovery tubing 23. Only predetermined time maintains such a condition and circulation of wash water 26 washes the inside of an ink circulation path.

[0020] The condition at the time of wash water recovery is shown by drawing 12. As shown in this drawing 12, at the time of wash water recovery, supply of the wash water 26 to the ink pot

28 and the ink chamber 12 is stopped by suspending actuation of the ink pump 18. Then, while closing the wash water supply side solenoid valve 19, solenoid valves 20 and 22 are opened.

[0021] Thereby, the wash water 26 in ink supply pipe 17c and 17b flows backwards the ink pump 18, a solenoid valve 20, and ink supply pipe 17a, and is collected into the waste fluid can 25. Moreover, the wash water 26 of the side which flows out of the ink pot 28 flows out via 17d of ink supply pipes, the ink chamber 12, ink recovery tubing 23a, a solenoid valve 22, and the ink recovery tubing 23, and is collected into the waste fluid can 25. Only predetermined time maintains such a condition and waiting and all wash water 26 are made to discharge the natural outflow by the self-weight of wash water 26.

[0022] After predetermined time furthermore passes, printing corresponding to degree order is started by connecting the tip of ink supply pipe 17a and the ink recovery tubing 23 to the ink container 21 which held the ink 13 of degree order, and performing ink circulation, after setting it as the condition that drawing 9 explained each part.

EFFECT OF THE INVENTION

[Effect of the Invention] As explained in full detail above, according to the flexographic press (claim 1) of this invention, by the very simple configuration of supplying air in an ink chamber through an air feed hopper from an air supply system, the compressed air can be fed into an ink chamber, internal pressure can be raised, and the following effectiveness thru/or advantages can be acquired.

[0049] (1) With the internal pressure of the ink chamber which carried out the pressure up of the recovery of the old order ink performed on the occasion of ink exchange, and the recovery of a penetrant remover, it becomes possible to carry out discharge recovery compulsorily, recovery time amount is far shortened to recovery by the conventional natural discharge, and ink swap time is shortened sharply. Therefore, the operating ratio of a flexographic press improves and productivity improves sharply.

[0050] (2) Since the old order ink of an ink circulation path, the interior of an ink chamber, and an anilox roll peripheral face can be removed completely, the ink of new order does not degenerate and printing failures, such as a fall of printing concentration and printing nonuniformity, do not occur by injection of a compressed air, the quality of printed matter improves sharply.

(3) The effectiveness which can add pneumatic pressure is in abbreviation homogeneity about the longitudinal direction into (claim 2) and an ink chamber by offering two or more air feed hoppers along with the longitudinal direction of an ink chamber.

TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention] However, since recovery of ink 13, recovery of the waste fluid after washing (wash water 26), etc. wait for the natural outflow by the self-weight of ink 13 or wash water 26 and are performed in case ink washing is performed in the conventional flexographic press mentioned above, the recovery cannot take time amount and ink swap time accompanying an order change cannot be shortened.

[0024] Moreover, wash water 26 is ** which passes the same path as ink 13, and since it is not what washes the internal surface of the ink chamber 12 etc. positively, washing of the wall of the ink chamber 12 etc. becomes imperfect. The ink of new order degenerated, the fall of printing concentration and the printing failure of printing nonuniformity and others versatility occurred not only the operating ratio of a printing machine falls according to such faults, but, and the technical problem of reducing the quality of printed matter also occurred.

[0025] It aims at offering the flexographic press which prevented that the ink of new order degenerated and aimed at improvement in the quality of printed matter while it shortens ink swap time, as it was originated in view of such a technical problem and this invention can perform certainly and efficiently a series of ink exchange cycles which include the ink recovery and ink washing within an ink circulation path on the occasion of the ink exchange accompanying an order change etc.

MEANS

[Means for Solving the Problem] In order to attain the above-mentioned purpose, the flexographic press (claim 1) of this invention A chamber frame and the seal blade prepared in chamber frame upper limit, Flexo ink is supplied into the ink chamber which is surrounded by the doctor blade formed in the chamber frame lower limit, and the anilox roll which rotates while contacting these seal blades and doctor blades, and is formed. In what prints by carrying out transition supply of the ink to the peripheral face of anilox roll, while preparing an air feed hopper in the ink chamber upper part It is characterized by connecting to an air feed hopper the air supply system which can supply high-pressure air from an air feed hopper into an ink chamber to proper timing.

[0027] At this time, two or more air feed hoppers may be prepared in accordance with the shaft orientations of anilox roll (claim 2).

[0028]

[Embodiment of the Invention] Hereafter, the gestalt of operation of this invention is explained with reference to a drawing. Each of typical side elevations which drawing 1 - drawing 6 show the flexographic press as 1 operation gestalt of this invention, and drawing 1 fractures the typical perspective view, and drawing 2 fractures the part, and are shown, drawing 3 - drawing 6 is drawings (the same perspective view as drawing 1) for explaining the ink exchange cycle in the flexographic press of this operation gestalt.

[0029] As shown in drawing 1 and drawing 2 , the flexographic press of this operation gestalt also consists of the ink feeder 1, anilox roll 2, a lithographic plate 3, a printing cylinder 4, and impression cylinder (carrier roll) 6 grade, and prints to the printing hands 5-ed, such as a corrugated paper sheet. [as well as the conventional thing shown in drawing 7 - drawing 12] Here, the lithographic plate 3 is coiled around the peripheral face of a printing cylinder 4. Moreover, anilox roll 2 carries out transition supply of the ink 13 on the front face of a lithographic plate 3 by rotating contacting the peripheral face (front face of a lithographic plate 3) of a printing cylinder 4, while flexo ink (only henceforth ink) 13 is supplied by the peripheral face from the ink feeder 1. Under the printing cylinder 4, opposite arrangement of the impression cylinder 6 is carried out, the printing hand 5-ed is put with rotation with an impression cylinder 6 and a printing cylinder 4 among these impression cylinders 6 and printing cylinders 4 (lithographic plate 3), and printing to the printing hand 5-ed is performed by the lithographic

plate 3.

[0030] Moreover, the chamber frame 7 on which the ink chamber 12 constitutes a posterior wall of stomach and a right-and-left both-sides wall also in the ink feeder 1 of this operation gestalt (only henceforth a frame), The seal blade 8 prepared in the upper limit of this frame 7, and the doctor blade 9 formed in the lower limit of a frame 7, By being surrounded with the anilox roll 2 which rotates while contacting these seal blades 8 and doctor blades 9 It is formed in accordance with the shaft orientations of anilox roll 2, and the ink 13 held in the ink chamber 12 contacts the front face of anilox roll 2.

[0031] Thus, the basic structure of the flexographic press of this operation gestalt is the same as that of what was mentioned above in drawing 7 - drawing 12, and among drawing, since the part the same [the same sign as a thing as stated above] or same is shown, the explanation is omitted. Moreover, the printing hands 5-ed, such as a corrugated paper sheet, are put between a printing cylinder 4 and an impression cylinder 6, ink 13 is transferred through a lithographic plate 3, that is, since a series of actuation which prints is the same as that of the conventional flexographic press, the explanation is omitted.

[0032] By the way, the flexographic press of this operation gestalt possesses the function for washing certainly and efficiently the ink 13 of the old order adhering to the peripheral face of an ink circulation path and anilox roll 2 in exchange of the ink 13 accompanying an order change etc., and it explains the configuration of the part concerning the function, an operation, and effectiveness hereafter, referring to drawing 1 - drawing 6.

[0033] As shown in drawing 1 and drawing 2, in the flexographic press of this operation gestalt, in accordance with the shaft orientations (the longitudinal direction of a chamber 12, the direction of equipment breadth) of anilox roll 2, the air feed hopper 14 of plurality (drawing 1 four) opens suitable spacing in the frame 7 of the ink chamber 12 upper part, and is prepared in it. The air supply pipes 15a-15d which branched from the air supply pipe 15 are connected to each air feed hopper 14. Sources of air, such as a compressor which the solenoid valve 16 which opens and closes this air supply pipe 15 is infixed, and also supplies air (compressed air) 24, are connected to the air supply pipe 15, and the air supply system which can supply high-pressure air 24 from the air feed hopper 14 into the ink chamber 12 to proper timing is constituted by these air supply pipes 15, 15a-15d, the solenoid valve 16, and the source of air.

[0034] In addition, like *****, by offering two or more air feed hoppers 14 along with the longitudinal direction of the ink chamber 12, it is constituted so that the pneumatic pressure of abbreviation homogeneity can be added about the longitudinal direction into the ink chamber 12. Moreover, with this operation gestalt, the ink feed hopper 10 is formed in the center section of the longitudinal direction (shaft orientations of anilox roll 2) of the frame 7 by the side of ink chamber 12 lower part, ink supply pipe 17c from the ink pump 18 is directly connected with this ink feed hopper 10, and the ink pot 28 (refer to drawing 7 - drawing 12) is omitted. Other ink circulation networks and wash water circulation networks are the same as that of the conventional thing mentioned above in drawing 7 - drawing 12.

[0035] Next, the ink exchange cycle in the flexographic press of this operation gestalt constituted like **** is explained, referring to drawing 3 R> 3 - drawing 6. The condition at the time of ink circulation, i.e., the condition under usual printing operation, is shown by drawing 3. As shown in this drawing 3, if the ink pump 18 is operated where it closed the wash water supply side solenoid valve 19 and the ink supply side solenoid valve 20 is opened, at the time of ink circulation, ink 13 will be sent in into the ink chamber 12 through the ink supply pipes 17a-17c and the ink feed hopper 10 from the ink container 21.

[0036] At this time, a solenoid valve 22 will be closed, it will be inhibited that the ink 13 in the ink chamber 12 flows out of ink recovery opening 11a and ink recovery tubing 23a, and ink 13 will be full in the ink chamber 12. And the ink 13 for the surplus supplied superfluously is sent out through surplus ink recovery opening 11b and surplus ink recovery tubing 23b, and is collected into the ink container 21 through the ink recovery tubing 23. Thus, where ink 13 is maintained at the specified quantity in printing operation of a flexographic press and within the ink chamber 12, circulation of ink 13 is performed.

[0037] The condition at the time of ink recovery is shown by drawing 4. As shown in this drawing 4, while stopping supply of the ink 13 to the ink pot 28 and the ink chamber 12 by suspending actuation of the ink pump 18, at the time of ink recovery, the solenoid valve 22 in the lower stream of a river of ink recovery tubing 23a is opened. Then, a pressure is added in the ink chamber 12 by opening the solenoid valve 16 by the side of air supply, and supplying high-pressure air 24 into the ink chamber 12 through the air supply pipes 15, 15a-15d and the air feed hopper 14.

[0038] By this the ink 13 in the ink chamber 12 The path which flows backwards the ink feed hopper 10, ink supply pipe 17c, the ink pump 18, ink supply pipe 17b, a solenoid valve 20, and ink supply pipe 17a, and results in the ink container 21 while receiving the pressure by air 24, It passes along either of the paths which result in the ink container 21 via ink recovery opening 11a, ink recovery tubing 23a, a solenoid valve 22, and the ink recovery tubing 23, and is compulsorily collected into the ink container 21. After only predetermined time maintains such a condition, a solenoid valve 16 is closed and air supply is suspended.

[0039] Since two or more air feed hoppers 14 are offered along with the longitudinal direction of the ink chamber 12 at this time, into the ink chamber 12, the pneumatic pressure of abbreviation homogeneity can be added about that longitudinal direction. The condition at the time of ink washing is shown by drawing 5. At the time of ink washing, as shown in this drawing 5, as it is shown in drawing 4, after collecting ink 13, the connection substitute of ink supply pipe 17a and the ink recovery tubing 23 is carried out from the ink container 21 to the waste fluid can 25, and the ink supply side solenoid valve 20 and the ink recovery side solenoid valve 22 are closed.

[0040] Then, while opening the wash water supply side solenoid valve 19, the wash water 26 from the wash water supply pipe 27 is sent in into the ink chamber 12 like the time of ink 13 circulating by operating the ink pump 18 through a solenoid valve 19, ink supply pipe 17b, the ink pump 18, ink supply pipe 17c, and the ink feed hopper 10.

[0041] Since the solenoid valve 22 is closed at this time, it is inhibited that the wash water 26 supplied in the ink chamber 12 flows out of ink recovery opening 11a and ink recovery tubing 23a, and the inside of the ink chamber 12 is full with wash water 26. And the wash water 26 with which it overflowed from surplus ink recovery opening 11b is sent out through surplus ink recovery tubing 23b, and is collected as waste fluid into the waste fluid can 25 through the ink recovery tubing 23.

[0042] Moreover, with this operation gestalt, when circulating wash water 26 as mentioned above and performing ink washing, by opening and closing the solenoid valve 16 by the side of air supply intermittently, and supplying high-pressure air 24 into the ink chamber 12, the wash water 26 in the ink chamber 12 is stirred compulsorily, and the cleaning effect by wash water 26 is heightened. Only predetermined time maintains such a condition and circulation of wash water 26 washes the inside of an ink circulation path.

[0043] The condition at the time of wash water recovery is shown by drawing 6. As shown in this drawing 6, at the time of wash water recovery, supply of the wash water 26 to the ink

chamber 12 is stopped by suspending actuation of the ink pump 18. Then, while closing the wash water supply side solenoid valve 19, solenoid valves 20 and 22 are opened. Then, a pressure is added in the ink chamber 12 by opening the solenoid valve 16 by the side of air supply, and supplying high-pressure air 24 into the ink chamber 12 through the air supply pipes 15, 15a-15d and the air feed hopper 14.

[0044] Like the time of ink recovery, by this the wash water 26 in the ink chamber 12 The path which flows backwards the ink feed hopper 10, ink supply pipe 17c, the ink pump 18, ink supply pipe 17b, a solenoid valve 20, and ink supply pipe 17a, and results in the ink container 21 while receiving the pressure by air 24, It passes along either of the paths which result in the ink container 21 via ink recovery opening 11a, ink recovery tubing 23a, a solenoid valve 22, and the ink recovery tubing 23, and is compulsorily collected as waste fluid into the waste fluid can 25. After only predetermined time maintains such a condition, a solenoid valve 16 is closed and air supply is suspended.

[0045] After completing discharge of wash water 26 as mentioned above, printing corresponding to degree order is started by connecting the tip of ink supply pipe 17a and the ink recovery tubing 23 to the ink container 21 which held the ink 13 of degree order, and performing ink circulation, after setting it as the condition that drawing 3 explained each part. Thus, according to the flexographic press as 1 operation gestalt of this invention At the time of recovery of ink 13 and wash water 26 and washing by wash water 26, suitably electromagnetism -- by carrying out switching operation of the source 16, and supplying air (compressed air) 24 in the ink chamber 12 through the air supply pipes 15, 15a-15d and the air feed hopper 15 In a series of activities (recovery of the ink of the old order, washing, waste fluid recovery, etc.) which the internal pressure of the ink chamber 12 can be raised and are done in ink exchange While being able to perform compulsive stirring of the wash water 26 in the ink chamber 12, ink 13 and wash water 26 can be made to be able to discharge compulsorily, and can be collected.

[0046] Therefore, cleaning effects, such as the interior of the peripheral face of anilox roll 2 and the ink chamber 12 and an ink circulation path, increase sharply, and also recovery time amount is far shortened to recovery by the conventional natural discharge, and the swap time of an ink color can be shortened sharply. Thereby, the operating ratio of a flexographic press improves and productivity improves sharply. Moreover, since the ink 13 of the old order can be removed completely, the ink 13 of new order does not degenerate and printing failures, such as a fall of printing concentration and printing nonuniformity, do not occur, the quality of printed matter improves sharply.

[0047] In addition, the actuation timing of a piping network or a bulb (a solenoid valve 16 and solenoid valves 19, 20, and 22) etc. is not limited to the operation gestalt mentioned above, and the various formats except having illustrated can be used for it. Moreover, this invention is not limited to the operation gestalt mentioned above, in the range which does not deviate from this invention and its meaning, can deform variously and can be carried out.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

Drawing 1 It is the perspective view showing typically the flexographic press as 1 operation gestalt of this invention.

Drawing 2 It is the typical side elevation fracturing and showing a part of flexographic press as

1 operation gestalt of this invention.

[Drawing 3] It is drawing for explaining the ink exchange cycle (printing operating status) in the flexographic press of this operation gestalt.

[Drawing 4] It is drawing for explaining the ink exchange cycle (ink recovery condition) in the flexographic press of this operation gestalt.

[Drawing 5] It is drawing for explaining the ink exchange cycle (ink washing condition) in the flexographic press of this operation gestalt.

[Drawing 6] It is drawing for explaining the ink exchange cycle (wash water recovery condition) in the flexographic press of this operation gestalt.

[Drawing 7] It is the perspective view showing the conventional flexographic press typically.

[Drawing 8] It is the typical side elevation fracturing and showing a part of conventional flexographic press.

[Drawing 9] It is drawing for explaining the ink exchange cycle (printing operating status) in the conventional flexographic press.

[Drawing 10] It is drawing for explaining the ink exchange cycle (ink recovery condition) in the conventional flexographic press.

[Drawing 11] It is drawing for explaining the ink exchange cycle (ink washing condition) in the conventional flexographic press.

[Drawing 12] It is drawing for explaining the ink exchange cycle (wash water recovery condition) in the conventional flexographic press.

[Description of Notations]

1 Ink Feeder

2 Anilox Roll

3 Lithographic Plate

4 Printing Cylinder

5 Printing Hand-ed

6 Impression Cylinder (Carrier Roll)

7 Chamber Frame

8 Seal Blade

9 Doctor Blade

10 Ink Feed Hopper

11a Ink recovery opening

11b Surplus ink recovery opening

12 Ink Chamber

13 Flexo Ink

14 Air Feed Hopper

15, 15a-15d Air supply pipe (air supply system)

16 Solenoid Valve (Air Supply System)

17a-17c Ink supply pipe

18 Ink Pump

19, 20, 22 Solenoid valve

21 Ink Container

23 23a Ink recovery tubing

23b Surplus ink recovery tubing

24 Air (Compressed Air)

25 Waste Fluid Can

26 Wash Water

27 Wash Water Supply Pipe

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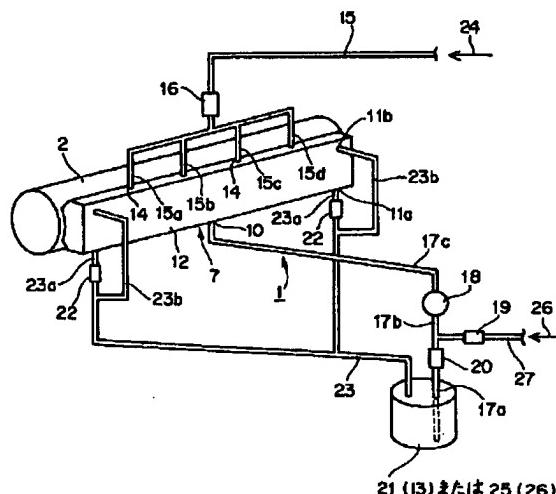
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(54)【発明の名称】 フレキソ印刷機

(57)【要約】

【課題】 オーダーチェンジ等に伴うインキ交換に際してインキ循環経路内のインキ回収およびインキ洗浄を含む一連のインキ交換サイクルを確実に且つ効率的に行なえるようにして、インキ交換時間を短縮するとともに、新オーダーのインキが汚濁するのを防止し印刷物の品質の向上をはかる。

【解決手段】 インキチャンバ12の上方にエア供給口14を設けるとともに、適宜のタイミングでエア供給口12からインキチャンバ内へ高圧のエアを供給しうるエア供給系(エア供給管15, 15a~15d)をエア供給口14に接続する。



【特許請求の範囲】

【請求項1】 チャンバフレームと、該チャンバフレーム上端に設けたシールブレードと、該チャンバフレーム下端に設けたドクターブレードと、これらのシールブレードおよびドクターブレードに接触しながら回動するアニロックスロールとにより囲まれて形成されるインキチャンバ内へフレキソインキを供給し、該アニロックスロールの外周面へインキを転移供給して印刷を行なうフレキソ印刷機において、

該インキチャンバ上方にエア供給口が設けられるとともに、

適宜のタイミングで該エア供給口から該インキチャンバ内へ高圧のエアを供給しうるエア供給系が、該エア供給口に接続されていることを特徴とする、フレキソ印刷機。

【請求項2】 該エア供給口が、該アニロックスロールの軸方向に沿って複数個設けられていることを特徴とする、請求項1記載のフレキソ印刷機。

【発明の詳細な説明】

【0001】

【発明の属する技術分野】本発明は、段ボール製函機により製造された段ボールシート等の被印刷体に対して印刷を行なうフレキソ印刷機に関する。

【0002】

【從来の技術】図7は從来のフレキソ印刷機を模式的に示す斜視図、図8は從来のフレキソ印刷機を一部破断して示す模式的な側面図であり、これらの図7および図8に示すように、フレキソ印刷機は、インキ供給装置1、アニロックスロール2、刷版3、版胴4、圧胴（受ロール）6等から構成され、段ボールシート等の被印刷体5に対し印刷を行なうものである。

【0003】ここで、版胴4の外周面には刷版3が捲着されている。また、アニロックスロール2は、その外周面にインキ供給装置1からフレキソインキ（以下、単にインキという）13を供給されるとともに版胴4の外周面（刷版3の表面）に接触しながら回転することにより、刷版3の表面にインキ13を転移供給するものである。版胴4の下方には、圧胴6が対向配置されており、圧胴6と版胴4との回転に伴ってこれらの圧胴6と版胴4（刷版3）との間に被印刷体5が挟み込まれ、刷版3により被印刷体5に対する印刷が行なわれるようになっている。

【0004】インキ供給装置1においては、インキチャンバ12が、後壁および左右両側壁を成すチャンバフレーム（以下、単にフレームという）7と、このフレーム7の上端に設けたシールブレード8と、フレーム7の下端に設けたドクターブレード9と、これらのシールブレード8およびドクターブレード9に接触しながら回動するアニロックスロール2とで囲まれることにより、アニロックスロール2の軸方向に沿って形成され、インキチ

ヤンバ12内に保持されるインキ13がアニロックスロール2の表面に接触するようになっている。

【0005】また、インキチャンバ12を一連のインキ循環経路に接続すべく、フレーム7の上部にはインキ供給口10が形成され、フレーム7の下部にはインキ回収口11aが形成されるほか、フレーム7の所定位置には、インキチャンバ12内のインキ13の量を一定に保持する（インキ液面の位置を一定に保持する）ために余剰インキを回収する余剰インキ回収口11bが形成されている。なお、図7に示すように、インキ供給口10は、フレーム7の長手方向（アニロックスロール2の軸方向）の中央部に一つだけ形成され、インキ回収口11aおよび余剰インキ回収口11bは、フレーム7の長手方向（アニロックスロール2の軸方向）の両端部に1つずつ形成されている。

【0006】そして、インキ容器21内のインキ13をインキチャンバ12へ供給するためのインキ供給系が、インキ供給管17a、ソレノイドバルブ20、インキ供給管17b、インキポンプ18、インキ供給管17c、インキポット28およびインキ供給管17dから構成されている。つまり、ソレノイドバルブ20を開いた状態でインキポンプ18を作動させることにより、インキ容器21内のインキ13は、吸い上げられて、インキ供給管17a、ソレノイドバルブ20、インキ供給管17b、インキポンプ18およびインキ供給管17cを経由してインキポット28へ供給された後、このインキポット28からインキ供給管17dおよびインキ供給口10を経由してインキチャンバ12へ供給されるようになっている。

【0007】一方、インキチャンバ12内のインキ13をインキ容器21に回収するためのインキ回収系が、インキ回収管23a、余剰インキ回収管23b、インキ回収管23、ソレノイド22から構成されている。つまり、インキチャンバ12底部のインキ回収口11aは、インキ回収管23a、ソレノイドバルブ22およびインキ回収管23を介してインキ容器21に接続されており、ソレノイドバルブ22を開くことで、インキチャンバ12内のインキ13は、自重により落下し、インキ回収口11a、インキ回収管23a、ソレノイドバルブ22およびインキ回収管23を経由してインキ容器21に回収されるようになっている。

【0008】また、余剰インキ回収口11bは、余剰インキ回収管23bを介して、ソレノイドバルブ22よりも下流側のインキ回収管23に合流・接続されており、インキチャンバ12内のインキ13が一定量（所定のインキ液面高さ）を超えると、その余剰分のインキ13が、常時、余剰インキ回収口11b、余剰インキ回収管23bおよびインキ回収管23を経由してインキ容器21内に回収されるようになっている。

【0009】なお、図7に示すように、ソレノイドバル

ブ20とインキポンプ18との間に介設されているインキ供給管17bには、ソレノイドバルブ19を介して洗浄水供給管27が連結されており、オーダーチェンジに伴うインキ交換等に際してインキ循環経路（インキ供給系およびインキ回収系）内のインキ洗浄を行なう際には、洗浄水供給管27を通じて洗浄水26が供給されるようになっている。このとき、インキ容器21に代えて廃液缶25をインキ循環経路に接続する。なお、洗浄動作の詳細については、図9～図12を参照しながら後述する。

【0010】上述の構成により、インキ容器21内のフレキソインキ13は、ソレノイドバルブ20を開いた状態でインキポンプ18を作動させることにより、インキ供給管17aに吸い上げられ、インキ供給管17a、ソレノイドバルブ20、インキ供給管17b、インキポンプ18およびインキ供給管17cを経由してインキポット28へ供給された後、このインキポット28からインキ供給管17dおよびインキ供給口10を経由してインキチャンバ12へ供給される。

【0011】インキチャンバ12内に供給されたインキ13は、アニロックスロール2の回転（図8中では反時計周り方向の回転）に伴い、このアニロックスロール2の外周面へ直接的に接触して付着した後、下流側のドクターブレード9により均一に掻き取られて所定厚のインキ被膜に調整されてインキチャンバ12の外へ送り出される。

【0012】そして、アニロックスロール2が、版胴4外周面の刷版3に接触しながら回転することにより、アニロックスロール2の外周面に付着したインキ13が、刷版3の表面に転移供給される。段ボールシート等の被印刷体5は、圧胴6と版胴4との回転に伴ってこれらの圧胴6と版胴4（刷版3）との間に挟み込まれ、この部分を通過しながら、インキ13を供給された刷版3に転接することにより、印刷を施される。

【0013】ところで、所定ロットの印刷が終了すると、次オーダにおいて必要とされる別色インキへの交換（オーダーチェンジ）が行なわれる。このインキ交換サイクルについて、図9～図12を参照しながら説明する。図9～図12は、いずれも、従来のフレキソ印刷機におけるインキ洗浄動作を含むインキ交換サイクルを説明するための図（図7と同様の斜視図）である。

【0014】図9では、インキ循環時の状態、つまり通常の印刷稼働中の状態が示されている。この図9に示すように、インキ循環時には、洗浄水供給側ソレノイドバルブ19を閉じ且つインキ供給側ソレノイドバルブ20を開いた状態でインキポンプ18を作動すると、インキ13は、インキ容器21からインキ供給管17a～17cを経由してインキポット28へ供給され、さらにインキ供給管17dおよびインキ供給口10を通じてインキチャンバ12内へ送り込まれる。

【0015】このとき、ソレノイドバルブ22は閉じられ、インキチャンバ12内のインキ13がインキ回収口11aおよびインキ回収管23aから流出することが抑止されており、インキチャンバ12内にはインキ13が充満することになる。そして、過剰に供給された余剰分のインキ13は、余剰インキ回収口11bおよび余剰インキ回収管23bを通じて送り出され、インキ回収管23を介してインキ容器21内へ回収される。このようにして、フレキソ印刷機の印刷稼働中、インキチャンバ12内でインキ13を所定量に保った状態でインキ13の循環が行なわれる。

【0016】図10では、インキ回収時の状態が示されている。この図10に示すように、インキ回収時には、インキポンプ18の作動を停止することによって、インキポット28およびインキチャンバ12へのインキ13の供給を止めるとともに、インキ回収管23aの下流におけるソレノイドバルブ22を開く。これにより、インキポット28へ流入する側のインキ13は、インキ供給管17c、インキポンプ18、インキ供給管17b、ソレノイドバルブ20およびインキ供給管17aを逆流してインキ容器21内へ回収される。また、インキポット28から流れる側のインキ13は、インキ供給管17d、インキチャンバ12、インキ回収管23a、ソレノイドバルブ22およびインキ回収管23を経由して流出し、インキ容器21内へ回収される。このような状態を所定時間だけ維持して、インキ13の自重による自然流出を待ってから、次の工程に入る。

【0017】図11では、インキ洗浄時の状態が示されている。この図11に示すように、インキ洗浄時には、図10に示すようにしてインキ13を回収した後、インキ供給管17aおよびインキ回収管23をインキ容器21から廃液缶25へ接続替えし、インキ供給側ソレノイドバルブ20およびインキ回収側ソレノイドバルブ22を開じる。

【0018】続いて、洗浄水供給側ソレノイドバルブ19を開くとともにインキポンプ18を作動することにより、洗浄水供給管27からの洗浄水26は、インキ13が循環する時と同様、ソレノイドバルブ19、インキ供給管17b、インキポンプ18およびインキ供給管17cを経由してインキポット28へ供給され、さらにインキ供給管17dを通じてインキチャンバ12内へ送り込まれる。

【0019】このとき、ソレノイドバルブ22は閉じられているので、インキチャンバ12内に供給された洗浄水26がインキ回収口11aおよびインキ回収管23aから流出することが抑止されており、インキチャンバ12内が洗浄水26により充満される。そして、余剰インキ回収口11bから溢れた洗浄水26は、余剰インキ回収管23bを通じて送り出され、インキ回収管23を介して廃液缶25内へ回収される。このような状態を所定

時間だけ維持して、インキ循環経路内を洗浄水26の流通により洗浄する。

【0020】図12では、洗浄水回収時の状態が示されている。この図12に示すように、洗浄水回収時には、インキポンプ18の作動を停止することによって、インキポット28およびインキチャンバ12への洗浄水26の供給を止める。続いて、洗浄水供給側ソレノイドバルブ19を閉じるとともにソレノイドバルブ20および22を開く。

【0021】これにより、インキ供給管17cおよび17b内の洗浄水26は、インキポンプ18、ソレノイドバルブ20およびインキ供給管17aを逆流して廃液缶25内へ回収される。また、インキポット28から流出する側の洗浄水26は、インキ供給管17d、インキチャンバ12、インキ回収管23a、ソレノイドバルブ22、インキ回収管23を経由して流出し、廃液缶25内へ回収される。このような状態を所定時間だけ維持して、洗浄水26の自重による自然流出を待ち、全ての洗浄水26を排出させる。

【0022】さらに所定時間が経過した後、インキ供給管17aおよびインキ回収管23の先端を、次オーダーのインキ13を収容したインキ容器21に接続し、各部を図9にて説明した状態に設定してから、インキ循環を行うことにより、次オーダーに対応した印刷を開始する。

【0023】

【発明が解決しようとする課題】しかしながら、上述した従来のフレキソ印刷機においてインキ洗浄を行なう際には、インキ13の回収や、洗浄後の廃液（洗浄水26）の回収等が、インキ13や洗浄水26の自重による自然流出を待って行なわれているため、その回収に時間を要し、オーダーチェンジに伴うインキ交換時間を短縮することができない。

【0024】また、洗浄水26はインキ13と同じ経路を通過させるだであり、積極的にインキチャンバ12の内壁面等を洗浄するものではないため、インキチャンバ12の内壁等の洗浄が不完全になる。これらの不具合によって、印刷機の稼働率が低下するばかりでなく、新オーダーのインキが汚濁し、印刷濃度の低下や印刷ムラその他種々の印刷障害が発生し、印刷物の品質を低下させるなどの課題もあった。

【0025】本発明は、このような課題に鑑み創案されたもので、オーダーチェンジ等に伴うインキ交換に際してインキ循環経路内のインキ回収およびインキ洗浄を含む一連のインキ交換サイクルを確実に且つ効率的に行なえるようにして、インキ交換時間を短縮するとともに、新オーダーのインキが汚濁するのを防止し印刷物の品質の向上をはかった、フレキソ印刷機を提供することを目的とする。

【0026】

【課題を解決するための手段】上記目的を達成するため

に、本発明のフレキソ印刷機（請求項1）は、チャンバフレームと、チャンバフレーム上端に設けたシールブレードと、チャンバフレーム下端に設けたドクターブレードと、これらのシールブレードおよびドクターブレードに接触しながら回動するアニロックスロールとにより囲まれて形成されるインキチャンバ内へフレキソインキを供給し、アニロックスロールの外周面へインキを転移供給して印刷を行なうものにおいて、インキチャンバ上方にエア供給口を設けるとともに、適宜のタイミングでエア供給口からインキチャンバ内へ高圧のエアを供給しうるエア供給系をエア供給口に接続したことを特徴としている。

【0027】このとき、エア供給口を、アニロックスロールの軸方向に沿って複数個設けてよい（請求項2）。

【0028】

【発明の実施の形態】以下、図面を参照して本発明の実施の形態を説明する。図1～図6は本発明の一実施形態としてのフレキソ印刷機を示すもので、図1はその模式的な斜視図、図2はその一部を破断して示す模式的な側面図、図3～図6は、いずれも、本実施形態のフレキソ印刷機におけるインキ交換サイクルを説明するための図（図1と同様の斜視図）である。

【0029】図1および図2に示すように、本実施形態のフレキソ印刷機も、図7～図12に示した従来のものと同様、インキ供給装置1、アニロックスロール2、刷版3、版胴4、圧胴（受ロール）6等から構成され、段ボールシート等の被印刷体5に対し印刷を行なうものである。ここで、版胴4の外周面には刷版3が捲着されている。また、アニロックスロール2は、その外周面にインキ供給装置1からフレキソインキ（以下、単にインキという）13を供給されるとともに版胴4の外周面（刷版3の表面）に接触しながら回転することにより、刷版3の表面にインキ13を転移供給するものである。版胴4の下方には、圧胴6が対向配置されており、圧胴6と版胴4との回転に伴ってこれらの圧胴6と版胴4（刷版3）との間に被印刷体5が挟み込まれ、刷版3により被印刷体5に対する印刷が行なわれるようになっている。

【0030】また、本実施形態のインキ供給装置1においても、インキチャンバ12が、後壁および左右両側壁を成すチャンバフレーム（以下、単にフレームという）7と、このフレーム7の上端に設けたシールブレード8と、フレーム7の下端に設けたドクターブレード9と、これらのシールブレード8およびドクターブレード9に接触しながら回動するアニロックスロール2とで囲まれることにより、アニロックスロール2の軸方向に沿って形成され、インキチャンバ12内に保持されるインキ13がアニロックスロール2の表面に接触するようになっている。

【0031】このように本実施形態のフレキソ印刷機の

基本構造は、図7～図12にて前述したものと同様であり、図中、既述のものと同一の符号は同一もしくは同様の部分を示しているので、その説明は省略する。また、段ボールシート等の被印刷体5を版胴4と圧胴6との間に挟み込んで刷版3を介してインキ13を転移させる、つまり印刷を行なう一連の動作も従来のフレキソ印刷機と同様であるので、その説明は省略する。

【0032】ところで、本実施形態のフレキソ印刷機は、オーダーチェンジ等に伴うインキ13の交換に当たって、インキ循環経路およびアニロックスロール2の外周面に付着した旧オーダーのインキ13を確実に且つ効率的に洗浄するための機能を具備するもので、以下、図1～図6を参照しながら、その機能に係る部分の構成、作用および効果について説明する。

【0033】図1および図2に示すように、本実施形態のフレキソ印刷機では、インキチャンバ12上方のフレーム7に、複数（図1では4つ）のエア供給口14が、アニロックスロール2の軸方向（チャンバ12の長手方向、装置横幅方向）に沿い適当な間隔をあけて設けられている。各エア供給口14には、エア供給管15から分岐したエア供給管15a～15dが接続されている。エア供給管15には、このエア供給管15を開閉する電磁弁16が介装されるほか、エア（圧縮空気）24を供給するコンプレッサ等のエア源が接続され、これらのエア供給管15、15a～15d、電磁弁16およびエア源により、適宜のタイミングでエア供給口14からインキチャンバ12内へ高圧のエア24を供給しうるエア供給系が構成されている。

【0034】なお、上述のごとく、エア供給口14をインキチャンバ12の長手方向に沿って複数そなえることにより、インキチャンバ12内へ、その長手方向について略均一の空気圧を附加できるように構成されている。また、本実施形態では、インキ供給口10がインキチャンバ12下方側のフレーム7の長手方向（アニロックスロール2の軸方向）の中央部に形成され、このインキ供給口10に、インキポンプ18からのインキ供給管17cが直接的に連結されており、インキポット28（図7～図12参照）が省略されている。その他のインキ循環系統や洗浄水循環系統は、図7～図12にて前述した従来のものと同様である。

【0035】次に、上述のごとく構成された本実施形態のフレキソ印刷機でのインキ交換サイクルについて、図3～図6を参照しながら説明する。図3では、インキ循環時の状態、つまり通常の印刷稼働中の状態が示されている。この図3に示すように、インキ循環時には、洗浄水供給側ソレノイドバルブ19を閉じ且つインキ供給側ソレノイドバルブ20を開いた状態でインキポンプ18を作動すると、インキ13は、インキ容器21からインキ供給管17a～17cおよびインキ供給口10を通じてインキチャンバ12内へ送り込まれる。

【0036】このとき、ソレノイドバルブ22は閉じられ、インキチャンバ12内のインキ13がインキ回収口11aおよびインキ回収管23aから流出することが抑止されており、インキチャンバ12内にはインキ13が充満することになる。そして、過剰に供給された余剰分のインキ13は、余剰インキ回収口11bおよび余剰インキ回収管23bを通じて送り出され、インキ回収管23を介してインキ容器21内へ回収される。このようにして、フレキソ印刷機の印刷稼働中、インキチャンバ12内でインキ13を所定量に保った状態でインキ13の循環が行なわれる。

【0037】図4では、インキ回収時の状態が示されている。この図4に示すように、インキ回収時には、インキポンプ18の作動を停止することによって、インキポット28およびインキチャンバ12へのインキ13の供給を止めるとともに、インキ回収管23aの下流におけるソレノイドバルブ22を開く。統いて、エア供給側の電磁弁16を開き、高圧のエア24を、エア供給管15、15a～15dおよびエア供給口14を通じてインキチャンバ12内へ供給することにより、インキチャンバ12内に圧力を付加する。

【0038】これにより、インキチャンバ12内のインキ13は、エア24による圧力を受けながら、インキ供給口10、インキ供給管17c、インキポンプ18、インキ供給管17b、ソレノイドバルブ20およびインキ供給管17aを逆流してインキ容器21に至る経路と、インキ回収口11a、インキ回収管23a、ソレノイドバルブ22およびインキ回収管23を経由してインキ容器21に至る経路とのいずれかを通って、インキ容器21内へ強制的に回収される。このような状態を所定時間だけ維持してから、電磁弁16を閉じてエア供給を停止する。

【0039】このとき、エア供給口14がインキチャンバ12の長手方向に沿って複数そなえられているので、インキチャンバ12内へは、その長手方向について略均一の空気圧を附加することができる。図5では、インキ洗浄時の状態が示されている。この図5に示すように、インキ洗浄時には、図4に示すようにしてインキ13を回収した後、インキ供給管17aおよびインキ回収管23をインキ容器21から廃液缶25へ接続替えし、インキ供給側ソレノイドバルブ20およびインキ回収側ソレノイドバルブ22を閉じる。

【0040】統いて、洗浄水供給側ソレノイドバルブ19を開くとともにインキポンプ18を作動することにより、洗浄水供給管27からの洗浄水26は、インキ13が循環する時と同様、ソレノイドバルブ19、インキ供給管17b、インキポンプ18、インキ供給管17cおよびインキ供給口10を通じてインキチャンバ12内へ送り込まれる。

【0041】このとき、ソレノイドバルブ22は閉じら

れているので、インキチャンバ1 2内に供給された洗浄水2 6がインキ回収口1 1 aおよびインキ回収管2 3 aから流出することが抑止されており、インキチャンバ1 2内が洗浄水2 6により充満される。そして、余剰インク回収口1 1 bから溢れた洗浄水2 6は、余剰インキ回収管2 3 bを通じて送り出され、インキ回収管2 3を通って廃液缶2 5内へ廃液として回収される。

【0042】また、本実施形態では、上述のように洗浄水2 6を循環させてインキ洗浄を行なっている際に、エア供給側の電磁弁1 6を断続的に開閉し、高圧のエア2 4をインクチャンバ1 2内へ供給することにより、インクチャンバ1 2内の洗浄水2 6を強制的に攪拌し、洗浄水2 6による洗浄効果を高めている。このような状態を所定時間だけ維持して、インキ循環経路内を洗浄水2 6の流通により洗浄する。

【0043】図6では、洗浄水回収時の状態が示されている。この図6に示すように、洗浄水回収時には、インキポンプ1 8の作動を停止することによって、インキチャンバ1 2への洗浄水2 6の供給を止める。続いて、洗浄水供給側ソレノイドバルブ1 9を開じるとともにソレノイドバルブ2 0および2 2を開く。続いて、エア供給側の電磁弁1 6を開き、高圧のエア2 4を、エア供給管1 5, 1 5 a～1 5 dおよびエア供給口1 4を通じてインキチャンバ1 2内へ供給することにより、インキチャンバ1 2内に圧力を付加する。

【0044】これにより、インキ回収時と同様、インキチャンバ1 2内の洗浄水2 6は、エア2 4による圧力を受けながら、インキ供給口1 0, インキ供給管1 7 c, インキポンプ1 8, インキ供給管1 7 b, ソレノイドバルブ2 0およびインキ供給管1 7 aを逆流してインキ容器2 1に至る経路と、インキ回収口1 1 a, インキ回収管2 3 a, ソレノイドバルブ2 2およびインキ回収管2 3を経由してインキ容器2 1に至る経路とのいづれかを通して、廃液缶2 5内へ強制的に廃液として回収される。このような状態を所定時間だけ維持してから、電磁弁1 6を閉じてエア供給を停止する。

【0045】上述のようにして洗浄水2 6の排出を完了した後、インキ供給管1 7 aおよびインキ回収管2 3の先端を、次オーダーのインキ1 3を収容したインキ容器2 1に接続し、各部を図3にて説明した状態に設定してから、インキ循環を行なうことにより、次オーダーに対応した印刷を開始する。このように、本発明の一実施形態としてのフレキソ印刷機によれば、インキ1 3や洗浄水2 6の回収時や洗浄水2 6による洗浄時に、適宜、電磁弁1 6を開閉操作してエア供給管1 5, 1 5 a～1 5 dおよびエア供給口1 5を通じてインキチャンバ1 2内にエア(圧縮空気)2 4を供給することにより、インキチャンバ1 2の内圧を上昇させることができ、インキ交換において行なわれる一連の作業(旧オーダーのインキの回収、洗浄および廃液回収等)において、インキチャンバ

1 2内における洗浄水2 6の強制攪拌を行なえるとともに、インキ1 3や洗浄水2 6を強制的に排出させて回収することができる。

【0046】従って、アニロックスロール2の外周面、インキチャンバ1 2の内部およびインキ循環経路等の洗浄効果が大幅に高まるほか、従来の自然排出による回収に対してはるかに回収時間が短縮され、インキ色の交換時間を大幅に短縮することができる。これにより、フレキソ印刷機の稼働率が向上し、生産性が大幅に向上する。また、旧オーダーのインキ1 3を完全に除去することができ、新オーダーのインキ1 3が汚濁せず印刷濃度の低下や印刷ムラ等の印刷障害が発生することができないので、印刷物の品質が大幅に向上する。

【0047】なお、配管系統やバルブ(電磁弁1 6やソレノイドバルブ1 9, 2 0, 2 2)の作動タイミング等は、上述した実施形態に限定されるものではなく、例示した以外の種々の形式を採用することができる。また、本発明は上述した実施形態に限定されるものではなく、本発明とその趣旨を逸脱しない範囲で種々変形して実施することができる。

【0048】

【発明の効果】以上詳述したように、本発明のフレキソ印刷機(請求項1)によれば、エア供給系からエア供給口を通じてインキチャンバ内にエアを供給するという極めて簡素な構成により、インキチャンバ内へ圧縮空気を送給し内圧を上昇させることができ、以下のようないい利点を得ることができる。

【0049】(1)インキ交換に際して行なわれる旧オーダーインキの回収、洗浄液の回収を昇圧したインキチャンバの内圧によって強制的に排出回収することが可能になり、従来の自然排出による回収に対してはるかに回収時間が短縮され、インキ交換時間が大幅に短縮される。従って、フレキソ印刷機の稼働率が向上し、生産性が大幅に向上する。

【0050】(2)圧縮空気の噴射によってインキ循環経路、インキチャンバ内部およびアニロックスロール外周面の旧オーダーインキを完全に除去することができ、新オーダーのインキが汚濁せず印刷濃度の低下や印刷ムラ等の印刷障害が発生することができないので、印刷物の品質が大幅に向上する。

(3)エア供給口をインキチャンバの長手方向に沿って複数そなえることにより(請求項2)、インキチャンバ内へ、その長手方向について略均一に空気圧を付加できる効果もある。

【図面の簡単な説明】

【図1】本発明の一実施形態としてのフレキソ印刷機を模式的に示す斜視図である。

【図2】本発明の一実施形態としてのフレキソ印刷機を一部破断して示す模式的な側面図である。

【図3】本実施形態のフレキソ印刷機におけるインキ交

換サイクル（印刷稼働状態）を説明するための図である。

【図4】本実施形態のフレキソ印刷機におけるインキ交換サイクル（インキ回収状態）を説明するための図である。

【図5】本実施形態のフレキソ印刷機におけるインキ交換サイクル（インキ洗浄状態）を説明するための図である。

【図6】本実施形態のフレキソ印刷機におけるインキ交換サイクル（洗浄水回収状態）を説明するための図である。

【図7】従来のフレキソ印刷機を模式的に示す斜視図である。

【図8】従来のフレキソ印刷機を一部破断して示す模式的な側面図である。

【図9】従来のフレキソ印刷機におけるインキ交換サイクル（印刷稼働状態）を説明するための図である。

【図10】従来のフレキソ印刷機におけるインキ交換サイクル（インキ回収状態）を説明するための図である。

【図11】従来のフレキソ印刷機におけるインキ交換サイクル（インキ洗浄状態）を説明するための図である。

【図12】従来のフレキソ印刷機におけるインキ交換サイクル（洗浄水回収状態）を説明するための図である。

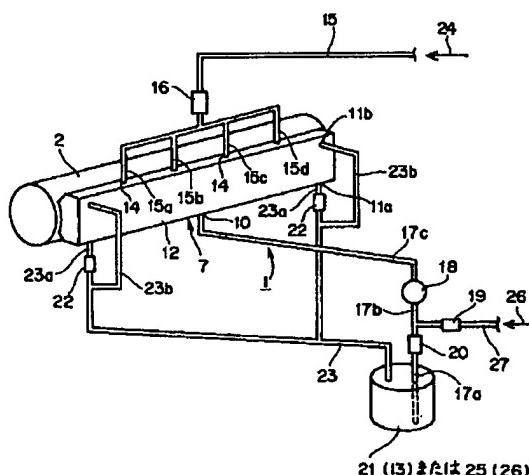
【符号の説明】

1 インキ供給装置

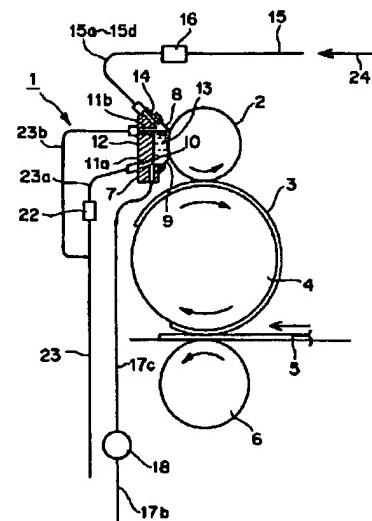
2 アニロックスロール

- | | |
|-------------|--------------|
| 3 | 刷版 |
| 4 | 版胴 |
| 5 | 被印刷体 |
| 6 | 圧胴（受ロール） |
| 7 | チャンバフレーム |
| 8 | シールブレード |
| 9 | ドクターブレード |
| 10 | インキ供給口 |
| 11a | インキ回収口 |
| 11b | 余剰インキ回収口 |
| 12 | インキチャンバ |
| 13 | フレキソインキ |
| 14 | エア供給口 |
| 15, 15a～15d | エア供給管（エア供給系） |
| 16 | 電磁弁（エア供給系） |
| 17a～17c | インキ供給管 |
| 18 | インキポンプ |
| 19, 20, 22 | ソレノイドバルブ |
| 21 | インキ容器 |
| 23, 23a | インキ回収管 |
| 23b | 余剰インキ回収管 |
| 24 | エア（圧縮空気） |
| 25 | 廃液缶 |
| 26 | 洗浄水 |
| 27 | 洗浄水供給管 |

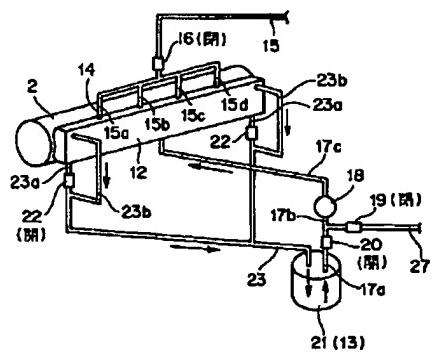
【図1】



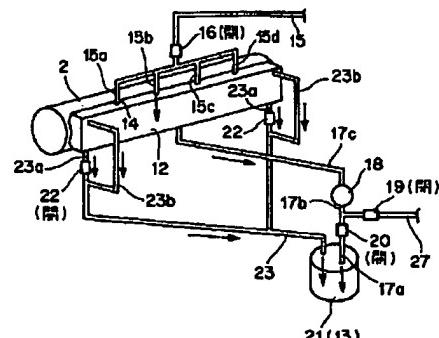
【図2】



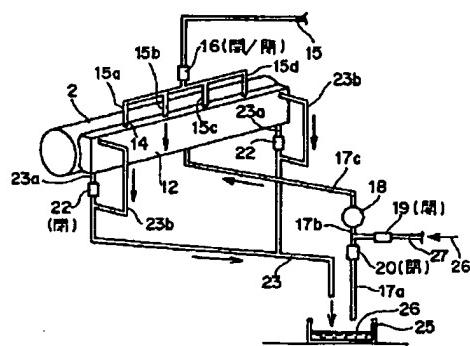
【図3】



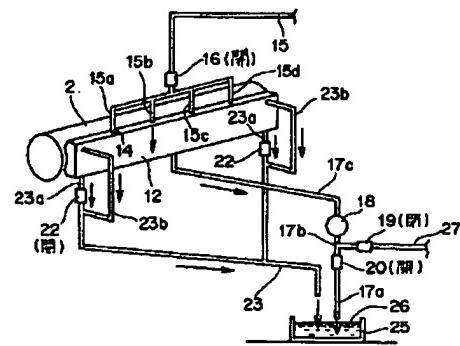
【図4】



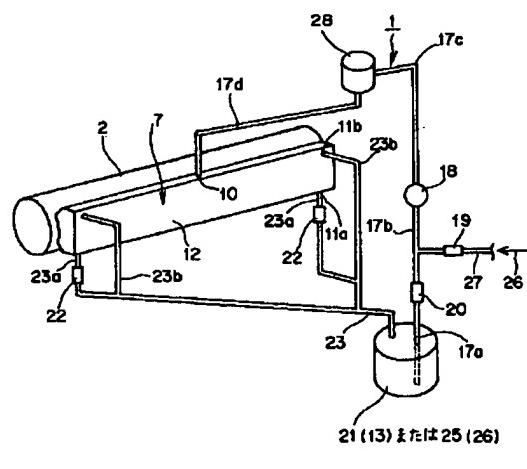
【図5】



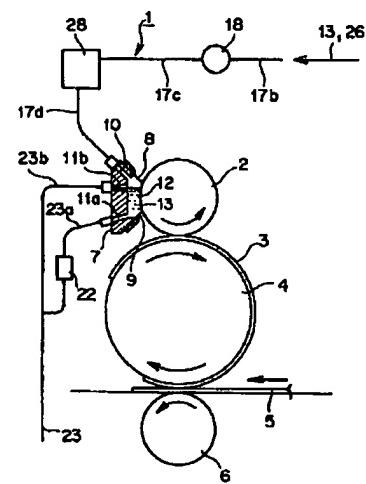
【図6】



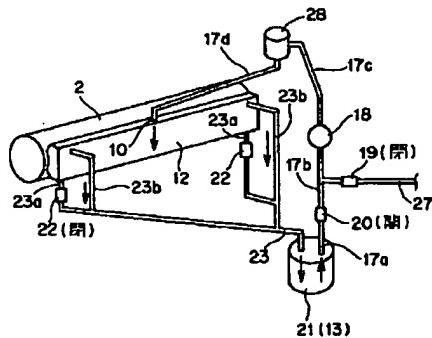
【図7】



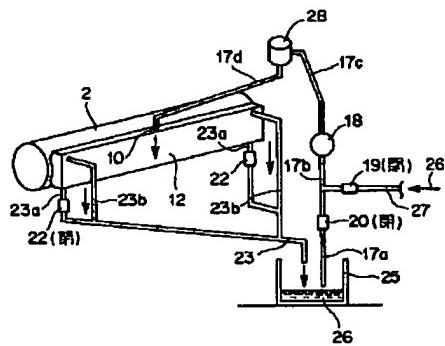
【図8】



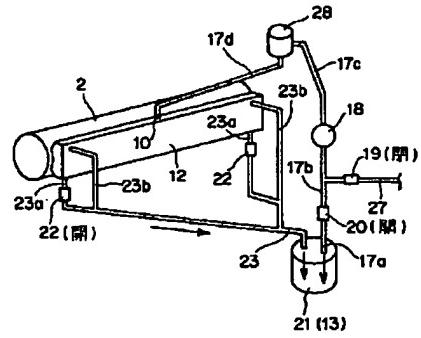
【図 9】



【図 11】



【図 10】



【図 12】

